AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.(Currently Amended) A communication network system comprising:

a resource managing unit for managing statuses of node resources in a network and statuses of link resources in said network,

a node function location controlling unit, in response to an instruction of relocation, analyzing current available node resource based on the statuses of the node resources managed by the resource managing unit, determining at least one new node ~~locations~~ location of at least one node ~~functions~~ function, and relocating the at least one node ~~functions~~ function at the at least one new node ~~locations~~ location ~~into an optimum condition~~, wherein the relocating of the at least one node function at least one new node location comprises changing programming of the at least one new node location with the at least one node function,

a path structure controlling unit for restructuring a structure of paths in said network ~~into an optimum condition~~, in accordance with said statuses of link resources which are managed by said resource managing unit, in response to an instruction of restructuring, and

an adaptive control determining unit configured to determine ~~for determining~~ whether ~~or not it is necessary~~ to transmit ~~either or both of~~ said instruction of relocation to said node function location controlling unit ~~and~~, configured to determine whether to transmit said instruction of restructuring to said path structure controlling unit, and configured to determine whether to transmit both said instruction of relocation to said node function location controlling unit and said instruction of restructuring to said path structure controlling unit on the basis of said statuses of node resources and said statuses of link resources which are managed by said resource managing unit, and transmitting said instruction of relocation when the transmission of said instruction of relocation is determined to be necessary or transmitting said instruction of restructuring when the transmission of said instruction of restructuring is determined to be necessary.

2. (Original) A communication network system according to Claim 1, further comprising:

service controlling devices each of which is one of said functional nodes and is capable of changing its own functions and data used for the functions, and comprises resources for providing communication services or data transfer services,

data transferring devices each of which is one of said functional nodes and is capable of changing its own functions, data used for the functions and connection statuses of paths for data communications, and comprises resources for providing communication services or data transfer services, and

a network structure controlling device which is connected to said service controlling devices and to said data transferring devices,

wherein, said network structure controlling device comprises said resource managing unit, said node function location controlling unit, said path structure controlling unit and said adaptive control determining unit.

3. (Original) A communication network system according to Claim 1, further comprising:

service controlling devices each of which is one of said functional nodes and is capable of changing its own functions and data used for the functions, and comprises resources for providing communication services or data transfer services,

data transferring devices each of which is one of said functional nodes and is capable of changing its own functions, data used for the functions and connection statuses of paths for data communications, and comprises resources for providing communication services or data transfer services,

network structure controlling devices which are distributed in said network, each of which comprises said node function location controlling unit, said path structure controlling unit and said adaptive control determining unit, and

a lock controlling unit for controlling locks of resources, when each of the resources should be controlled by only one of said network structure controlling devices to achieve the relocation or the restructuring, for avoiding each of the resources being controlled by more than one of said network structure controlling devices.

4. (Currently Amended) A network structure controlling device comprising:

a node function location controlling unit, in response to an instruction of relocation, analyzing current available node resource based on the statuses of the node resources managed by the resource managing unit, determining at least one new node ~~locations~~ location of at least one node ~~functions~~ function, and relocating the at least one node ~~functions~~ function at the at least one new node ~~locations~~ location ~~into an optimum condition~~, wherein the relocating of the at least one node function at least one new node location comprises changing programming of the at least one new node location with the at least one node function,

a path structure controlling unit for restructuring a structure of paths in said network ~~into an optimum condition~~, in accordance with statuses of link resources in said network, in response to an instruction of restructuring, and

an adaptive control determining unit configured to determine ~~for determining~~ whether ~~or not it is necessary~~ to transmit ~~either or both of~~ said instruction of relocation to said node function location controlling unit ~~and~~, configured to determine whether to transmit said instruction of restructuring to said path structure controlling unit, and configured to determine whether to transmit both said instruction of relocation to said node function location controlling unit and said instruction of restructuring to said path structure controlling unit on the basis of said statuses of node resources and said statuses of link resources which are managed by said resource managing unit, and transmitting said instruction of relocation when the transmission of said instruction of relocation is determined to be necessary or transmitting said instruction of restructuring when the transmission of said instruction of restructuring is determined to be necessary.

5. (Original) A network structure controlling device according to Claim 4, wherein:

said adaptive control determining unit makes the determination when said adaptive control determining unit receives a request for an adaptive control of said node resources or said link resources from an external device.

6. (Previously Presented) A network structure controlling device according to Claim 4, further comprising:

a resource status collecting unit for collecting data on said statuses of node resources and data on said statuses of link resources in said network through said network, and

a resource managing unit for storing said data on said statuses of node resources and said data on said statuses of link resources which are collected by said resource status collecting unit.

7. (Currently Amended) A network structure controlling device ~~according to Claim 4, further~~ comprising:

a node function location controlling unit, in response to an instruction of relocation, analyzing current available node resource based on the statuses of the node resources managed by the resource managing unit, determining new node locations of node functions, and relocating the node functions at the new node locations into an optimum condition,

a path structure controlling unit for restructuring a structure of paths in said network into an optimum condition, in accordance with statuses of link resources in said network, in response to an instruction of restructuring,

an adaptive control determining unit for determining whether or not it is necessary to transmit either or both of said instruction of relocation to said node function location controlling unit and said instruction of restructuring to said path structure controlling unit on the basis of said statuses of node resources and said statuses of link resources which are managed by said resource managing unit, and transmitting said instruction of relocation when the transmission of said instruction of relocation is determined to be necessary or transmitting said instruction of restructuring when the transmission of said instruction of restructuring is determined to be necessary,

a lock control requesting unit which transmits, when said instruction of relocation or said instruction of restructuring is transmitted and a certain resource is controlled by said network structure controlling device, a request for a lock control for avoiding said certain resource being controlled by another network structure controlling device, to a resource managing device for managing resources in said network.

8. (Original) A network structure controlling device according to any one of Claims 4 to 7, wherein:

said node function location controlling unit makes an optimum plan of said relocation and said path structure controlling unit makes an optimum plan of said restructuring by

exchanging with each other data on a draft plan of said relocation and data on a draft plan of said restructuring.

9. (Previously Presented) A network resource status managing device comprising:

a resource status collecting unit for collecting data on statuses of node resources and data on statuses of link resources in a network through said network,

a network resource status storing unit for storing said data on statuses of node resources and said data on statuses of link resources which are collected by said resource status collecting unit,

a network structure controlling device for relocating functions of nodes or for restructuring paths in said network, and

a lock controlling unit, in response to a request for a lock control, for locking control of a certain resource thereby preventing the network structure controlling device from relocating functions of the certain resource and from restructuring of the paths related to the certain resource.

10. (Currently Amended) An adaptive control method comprising:

a node resource status monitoring step for a service controlling device and a data transferring device, which are included in a communication network system, to monitor statuses of node resources, which are resources for providing communication services or data transfer services, and to transmit data indicating said statuses of node resources,

a link resource status monitoring step for said data transferring device to monitor statuses of link resources, which are resources for providing data transfer services, and to transmit data indicating said statuses of link resources,

a network resource status collecting step for a network resource status managing device in said communication network system to receive and store said data indicating said statuses of node resources transmitted in said node resource status monitoring step and to receive and store said data indicating said statuses of link resources transmitted in said link resource status monitoring step,

an adaptive control determining step for a network structure controlling device in said communication network system to determine whether it is necessary to relocate functions and

data for the functions of said service controlling device or of said data transferring device, ~~or to~~

~~determine whether it is necessary to restructure paths connected to said data transferring device,~~

~~on the basis of data indicating said statuses of node resources and data indicating said statuses of~~

~~link resources which are stored in said network resource status managing device, or in~~

~~accordance with a request for an adaptive control of said node resources or said link resources~~

~~from an external device,~~

      a planning step where

      said network structure controlling device makes a plan of relocation of the functions and

the data for the functions so that said node resources and said link resources can be used in an

optimum condition, and transmits an instruction to instruct said relocation of the functions and

the data for the functions to said service controlling device or to said data transferring device,

when it is determined to be necessary to relocate the functions and the data for the functions in

said adaptive control determining step, <u>wherein the relocation of the functions comprises</u>

<u>changing programming with the at least one node function, and</u>

      ~~or, said network structure controlling device makes a plan of restructuring of the paths so~~

~~that said node resources and said link resources can be used in an optimum condition, and~~

~~transmits an instruction to instruct said restructuring of the paths to said service controlling~~

~~device or to said data transferring device, when it is determined to be necessary to restructure the~~

~~paths in said adaptive control determining step, and~~

      an optimizing step where

      said service controlling device or said data transferring device changes its functions and

data for the functions in accordance with said instruction to instruct said relocation of the

functions and the data for the functions~~,~~

      ~~or, said data transferring device changes its paths in accordance with said instruction to~~

~~instruct said restructuring of the paths~~.

11. (Currently Amended) An adaptive control method according to Claim 10, wherein:

      in said planning step,

      said network structure controlling device further transmits, to said network resource

status managing device, a request for a lock control for avoiding said node resources and said

link resources, which are controlled by said network structure controlling device after the

relocation, being controlled by another network structure controlling device, when it is determined to be necessary to relocate the functions and the data for the functions in said adaptive control determining step,

~~or, said network structure controlling device further transmits, to said network resource status managing device, a request for a lock control for avoiding said node resources and said link resources, which are controlled by said network structure controlling device after the restructuring, being controlled by another network structure controlling device, when it is determined to be necessary to restructure the paths in said adaptive control determining step,~~

and said adaptive control method further comprises

a lock controlling step for said network resource status managing device to receive the request for a lock control which is transmitted in said planning step, and to control locks of said node resources and said link resources in accordance with the request for a lock control.

12. (Currently Amended) An adaptive control method according to Claim 11, wherein:

in said planning step,

said network structure controlling device makes an optimum plan of relocation of the functions and the data for the functions ~~or an optimum plan of restructuring of the paths~~, on the basis of data on a draft plan of relocation of the functions ~~and the data for the functions and data on a draft plan of restructuring of the paths~~.

13. (Currently Amended) A communication network system according to Claim 1, wherein the node function location controlling unit analyzes current available link resources based on the statuses of link resources in said network managed by the resource managing unit;

wherein the node function location controlling unit determines interim node locations of interim node function;

wherein the node function location controlling unit transmits the interim node locations of the interim node functions to the path structure controlling unit;

wherein the node function location controlling unit receives data of link path restructuring from the path structure controlling unit; and

wherein the node function location controlling unit finalizes the new node locations of the node functions based on the data of the link path restructuring in order to achieve [[the]] an optimum condition.

14. (Previously Presented) A network resource status managing device according to Claim 9, wherein the network structure controlling device comprises a plurality of network structure controlling devices,

wherein a certain network structure controlling device controls the certain resource, and

wherein the lock controlling unit locks control from a remainder of the plurality of network structure controlling devices so that only the certain network structure controlling device controls the certain resource.

15. (New) A communication network system according to Claim 1, wherein the node function controlling unit determines a first device from which to transfer the at least one node function to a second device;

wherein the path structure controlling unit determines a new communication path;

wherein the node function location controlling unit receives data on the new communication path determined by the path structure controlling unit, and determines the first device and the second device on the basis of the data on the new communication path; and

wherein the path structure controlling unit receives data on the first device and the second device determined by the node function location controlling unit, and determines the new communication path on the basis of the data on the first device and the second device.

16. (New) A communication network system according to Claims 15, wherein the function of the second device to be reconfigured comprises at least one of a firewall function, a mobility control function, a call control function, a data copy function, a multicast function, a mobile anchor function, and a mobile buffering function.

17. (New) A communication network system according to Claim 1, wherein the at least one new node location receives data indicative of the at least one node function, the data enabling the at

least one node function so that node functions processed at the at least one new node location are changed.

18. (New) A communication network system according to Claim 17, wherein the node function location controlling unit transfers the at least one node function from a first node to the at least one new node.

19. (New) A network structure controlling device according to Claim 4, wherein the node function controlling unit determines a first device from which to transfer the at least one node function to a second device;

    wherein the path structure controlling unit determines a new communication path;

    wherein the node function location controlling unit receives data on the new communication path determined by the path structure controlling unit, and determines the first device and the second device on the basis of the data on the new communication path; and

    wherein the path structure controlling unit receives data on the first device and the second device determined by the node function location controlling unit, and determines the new communication path on the basis of the data on the first device and the second device.

20. (New) A network structure controlling device according to Claims 19, wherein the function of the second device to be reconfigured comprises at least one of a firewall function, a mobility control function, a call control function, a data copy function, a multicast function, a mobile anchor function, and a mobile buffering function.

21. (New) A network structure controlling device according to Claim 4, wherein the at least one new node location receives data indicative of the at least one node function, the data enabling the at least one node function so that node functions processed at the at least one new node location are changed.

22. (New) A network structure controlling device according to Claim 21, wherein the node function location controlling unit transfers the at least one node function from a first node to the at least one new node.

23. (New) A network configuration managing device comprising:

a node resource status data collecting unit that receives first data on status of a node resource that a device constituting a network has, the node resource being a resource used for providing a communication service or transferring data;

a link resource status data collecting unit that receives second data on status of a link resource of a device constituting the network, the link resource being a resource used for transferring data;

a network resource status data storing unit that stores the first data and the second data;

an adaptive control necessity determining unit that determines on the basis of the first data and the second data stored in the network resource status data storing unit, or in accordance with a request for an adaptive control of the node resource from an external device, whether it is necessary to perform relocation of a function of a device constituting the network, and determines on the basis of the first data and the second data stored in the network resource status data storing unit, or in accordance with a request for an adaptive control of the link resource from an external device, whether it is necessary to perform reconfiguration of a communication path formed in the network;

a node function location controlling unit that, if it is determined by the adaptive control necessity determining unit that relocation of a function of a device constituting the network is necessary, determines a first device constituting the network whose data for providing a node function is to be transferred and a second device constituting the network that receives the data for providing a node function from the first device, and reconfigures a function of the second device using the data for providing a node function; and

a link configuration controlling unit that, if it is determined by the adaptive control necessity determining unit that reconfiguration of a communication path formed in the network is necessary, determines a new communication path to be formed in the network;

wherein determination of at least one of the new communication path or the first and second devices is dependent on determination of the other of the first and second devices or the new communication path.

24. (New) A network configuration managing device according to Claim 23 wherein the link configuration controlling unit generates a provisional determination of the new communication path; and

wherein the node function location controlling unit generates a final determination of the first device and the second device based on the provisional determination of the new communication path.

25. (New) A network configuration managing device according to Claim 24, wherein the node function location controlling unit generates a provisional determination of the first device and the second device;

wherein the node function location controlling unit sends the provisional determination of the first device and the second device to the link configuration controlling unit; and

wherein the link configuration controlling unit generates a final determination of the new communication path based on the provisional determination of the first device and the second device.

26. (New) A network configuration managing device according to Claim 23 wherein the node function location controlling unit generates a provisional determination of the first device and the second device; and

wherein the link configuration controlling unit generates a final determination of the new communication path based on the provisional determination of the first device and the second device.

27. (New) A network configuration managing device according to Claim 23 further comprising an exclusive control enabling unit that, if it is determined by the adaptive control necessity determining unit that relocation of a function of a device constituting the network is necessary, prevents a node resource and a link resource of the first device and the second device from being controlled by another network configuration managing device constituting the network.

28. (New) A network configuration managing device according to Claims 23 or 27, wherein the function of the second device to be reconfigured comprises at least one of a firewall function, a mobility control function, a call control function, a data copy function, a multicast function, a mobile anchor function, and a mobile buffering function.